

CLAIMS:

1. A vascular closure system, comprising:
 - a sheath including a plurality of hollow lobes;
 - a guiding device disposed within one of the hollow lobes;
 - an expandable needle disposed within a different one of the hollow lobes; and
 - a hooking device disposed within yet another different one of the hollow lobes, wherein the hooking device is configured to hook the expandable needle.
2. The vascular closure system of claim 1 wherein the sheath includes three hollow cylindrical lobes.
3. The vascular closure system of claim 1 wherein the sheath comprises a distal profile capable of dilating tissue.
4. The vascular closure system of claim 1 wherein the guiding device further comprises:
 - an access needle; and
 - a guide wire configured to conform to the shape of the interior surface of a vessel.

5. The vascular closure system of claim 1 wherein the guiding device further comprises:

an access needle; and
a bent guide wire configured to conform to the shape of the interior surface of a vessel.

6. The vascular closure system of claim 1 wherein the guiding device comprises an expandable foot.

7. The vascular closure system of claim 1 wherein the guiding device is configured to be inserted into a first opening in a vessel, the expandable needle is configured to be inserted into a second opening in the vessel, and the hooking device is configured to be inserted into a third opening in the vessel.

8. The vascular closure system of claim 1 wherein the sheath includes three lobes, a left lobe, a center lobe and a right lobe, and wherein the guiding device is disposed within the center lobe, the expandable needle is disposed within the left lobe, and the hooking device is disposed within the right lobe.

9. The vascular closure system of claim 1 wherein the expandable needle further comprises:

a needle tip configured to pierce the surface of a vessel;
an expandable mesh that includes an expanded state and an extended state;
an insertion rod configured to insert the expandable needle without expanding the expandable mesh; and
an actuator configured to expand the expandable mesh into the expanded state.

10. The vascular closure system of claim 1 wherein the hooking device further comprises:

a curved hollow needle configured to pierce the surface of a vessel;
a suture extending through the curved hollow needle; and
a piercing toggle connected to the suture and disposed on an end of the curved hollow needle such that a contiguous piercing surface is formed with the end of the curved hollow needle and the piercing toggle.

11. The vascular closure system of claim 1 wherein the hooking device further comprises:

a tubular curved hollow needle configured to pierce the surface of a vessel;
a degradable suture extending through the curved hollow needle; and
a piercing toggle connected to the suture and disposed on an end of the curved hollow needle such that a contiguous piercing surface is formed with the end of the curved hollow needle and the piercing toggle, wherein the piercing toggle is shaped to provide an efficient hooking surface.

12. A vascular closure system, comprising:

- a sheath including three hollow lobes;
- a guiding device disposed within one of the hollow lobes, wherein the guiding device further includes:
 - an access needle;
 - a guide wire configured to conform to the shape of the interior surface of a vessel;
 - an expandable needle disposed within a different one of the hollow lobes, wherein the expandable needle further includes:
 - a needle tip configured to pierce the surface of a vessel;
 - an expandable mesh that includes an expanded state and an extended state;
 - an insertion rod configured to insert the expandable needle without expanding the expandable mesh;
 - an actuator configured to expand the expandable mesh into the expanded state;
 - a hooking device disposed within yet another different one of the hollow lobes, wherein the hooking device is configured to hook the expandable needle, wherein the hooking device further includes:
 - a curved hollow needle configured to pierce the surface of a vessel;
 - a suture extending through the curved hollow needle; and

a suture extending through the curved hollow needle and a toggle connected to the suture and disposed on the end of the curved hollow needle.

13. A method of extending a length of suture across a vessel opening prior to dilation of the vessel opening, comprising:

positioning a vascular closure system over a first opening in a vessel, wherein the vascular closure system includes a guiding device, an expandable needle, and a hooking device;

inserting a guiding device into the first opening in a vessel to align the vascular closure system in relation to the first opening;

inserting the expandable needle into a second opening in the vessel;

inserting the hooking device into a third opening in the vessel;

hooking the expandable needle with the hooking device; and

retracting the guiding device, expandable needle, and hooking device such that an internal suture pass is formed across the vessel opening prior to dilating the vessel opening and performing a medical procedure.

14. The method of claim 13 wherein positioning a vascular closure system over a first opening in a vessel further includes angling the vascular closure system at a specific angle from normal to the vessel to facilitate the angular insertion of the guiding device, an expandable needle, and a hooking device.

15. The method of claim 13 wherein inserting a guiding device into the first opening in a vessel to align the vascular closure system in relation to the first opening further includes extending the guiding device within the vessel to orient the closure device a certain distance away from the interior of the vessel wall.

16. The method of claim 13 wherein inserting the expandable needle into a second opening in the vessel further includes inserting the expandable needle in an extended state and then expanding the expandable needle into an expanded state.

17. The method of claim 13 wherein hooking the expandable needle with the hooking device is performed automatically when the hooking device is inserted into the third opening in the vessel.

18. A method of extending a suture across a vessel opening before a medical procedure is performed via the vessel opening, comprising:

- extending a suture across a vessel opening;
- pushing the suture to a side of the vessel opening;
- dilating the opening by inserting a sheath into the vessel opening;
- performing a medical procedure via the sheath;
- removing the sheath from the vessel opening;
- cinching the suture to approximate tissue surrounding the vessel opening.